

CONFIRMED MINUTES

Fifteenth Meeting of the International Harmonised Research Activities

Side Impact Working Group

09:30am 21 - 22 May 2002

**Comité des Constructeurs Français d'Automobiles (CCFA)
2, rue de Presbourg
PARIS**

1. Introductions

Attendance:

Keith Seyer (Chair)	Department of Transport & Regional Services, Australia
Mark Terrell (Secretary)	Department of Transport & Regional Services, Australia
Dainius Dalmotas	Transport Canada
Suzanne Tylko (part)	Transport Canada
Richard Lowne	EEVC
Joseph Kanianthra	National Highway Traffic Safety Administration, USA
Stuart Southgate	OICA North America / AAM (proxy for Michael Leigh)
Christoph Mueller	OICA Europe
Minoru Sakurai	JASIC / JARI
Hideki Yonezawa	JMLIT, National Traffic Safety and Environment Laboratory
Akihisa Maruyama (part)	OICA Asia-Pacific
Michiel van Ratingen	EEVC
Adrian Lund (guest)	Insurance Institute for Highway Safety
Martin Page (guest)	WorldSID Task Group

2. Confirmation of agenda

The agenda was confirmed with changes as noted in these Minutes.

3. Confirmation of minutes of previous meeting

The minutes of the previous meeting were confirmed following some changes which are recorded in {Document 166}.

4. Report from IHRA Steering Committee

The IHRA Steering Committee (SC) met on the 9th and 10th of May at NHTSA headquarters, Washington DC to hear reports from WG Chairs. The Side Impact Working Group (SIWG) report (as circulated to members in March) was presented by Mr Seyer. At the meeting Mr Seyer sought guidance from the committee regarding options to maximise harmonisation. Mr Seyer suggested two possible options:

- 1 One worst case test to cover fleets in all regions – MDB and vehicle / dummy configuration to represent worst case of all fleets.
2. Two tests – 1 to represent impact from a passenger car, 2nd (optional) to represent SUV, to only apply in regions with a large SUV / LTV population

Option 2 was most favoured by the SC – to consider at a 2 test option for the MDB test. While the SC noted that one worst case test was optimum for harmonisation, it may be difficult to prove just what that worst case might be.

Mr Dalmotas suggested that it is possible to have a worst case test that will cover both fleet types, particularly since IIHS mass has gone back to 1500kg. IIHS barrier should not be seen as representing “only an SUV”. (to be discussed in more detail later in agenda)

A panel discussion on IHRA will be conducted at Nagoya ESV with particular focus on the Side Impact and Pedestrian groups in order to:

Clarify what is expected from IHRA

NHTSA fear that process is not as public as NHTSA usual methods – ESV presents an opportunity for public discussion

Discussions to be noted and reported

Other working groups have been directed to use Side Impact terms of reference as a model. The side impact group is regarded as having made most progress and is being presented as the model group for the IHRA concept. The SC made the point that there was an expectation that the SIWG would be able to “deliver the goods” for the 2003 ESV conference in Nagoya.

(ACTION: The group)

5. Report from WorldSID Task Group

Mr Page gave a presentation on the current status of the WorldSID program.

The most recent task group meeting was held 11/12 March in USA. Previously there was some difficulty holding meetings because of travel restrictions (following September 11 attacks).

After expiry of the previous project management contract a new project management team was appointed in March 2002: Dynamic Research Inc, Torrance CA. Principal contacts are Ken Wiley (project manager) and John Zellner (CEO).

Prototype improvements required and under development: Shoulder deflection too high, pelvis too stiff, neck biofidelity to be improved (shoulder response will have an effect), half arm design issues, in-dummy DAS upgrade.

- Pelvis revisions including reshaping of pelvis bone and relocation of the load cell (with less channels), transfer of mass from pelvis to thigh flesh.
- Revised Half-arm – reduced size, plastic bone – more correct size, removed accelerometers.
- Revised DAS – simplified wiring, connectors, sensor modules deleted, simplified calibration

Further evaluation to be undertaken by SIBER (includes some modified parts), TC (repeat TR9790), then available for NHTSA over summer 2002.

Release of the dummy (production and design into public domain – ISO and NHTSA format) is still planned for 2004. First deliveries of pre-production dummies are planned to start at end 2002.

A newsletter with a status report of the dummy was provided at GRSP in Geneva.

There is a new chairman for the Asia-Pacific region – Mr Akihiko Akiyama of Honda.

Management of the WorldSID website will now be through DRI.

The group noted that some of the NHTSA work for IHRA Biomechanics requirements was presented at SAE in the week before this meeting.

6. Report from IHRA Biomechanics Working Group

There was an extensive presentation at the IHRA steering committee meeting on the progress of the Biomechanics group – a large amount of work has been done, mostly by NHTSA. Proposed 4 criteria for side impact, (TTI was not one). The report of the Biofidelity working group containing requirements for side impact is due in December 2002.

Mr Kanianthra undertook to provide an update at the September SIWG meeting. **(ACTION)**

7. Report from EEVC WG13.

7.1. EEVC MDB – presentation by Mr Lowne

A recap of the previous meeting's presentation was provided for information of Mr Lund.

Mr Lowne reiterated a concern that the IIHS barrier produces loads much higher than observed in car to car tests. There is also a remaining concern that a stiff IIHS barrier will favour countermeasures that will not be effective for real world, particularly stiffening of the B-pillar only.

Mr Lund noted that design of countermeasures for the IIHS test would start with the B-pillar, but doors would need to be stiffened as well. He also queried the effectiveness of the EEVC test procedure for crashes where the bullet vehicle does not exactly straddle the B-pillar.

Mr Lowne presented some new test data – MDB v Camry, Freeland v Camry {Registered Document 170}

7.2. EEVC Headform

The status was fairly similar to what was presented at last meeting with some small changes to specifications. An evaluation program has recently commenced – TRL has tested one vehicle, 2 further are scheduled.

EEVC has considered IHRA SIWG request to consider non-struck side zones – awaiting video from Transport Canada to assist in defining the zones.

A report (including a draft test procedure) to EEVC is expected at around end of 2002.

Mr Kanianthra undertook to provide advice on what zones of FMVSS 201 might be suitable for protection of occupants in non-struck side impacts. **(ACTION)**

Mr Lowne requested advice from other regions on head contact zones from real-world data. **(ACTION: The group)**

8. Geometric Studies of the Fleet

8.1. Door aperture and wheelbase measurements - inclusion of front/rear R-point separation [NHTSA, Australia, TC, Japan]

Mr van Ratingen presented an update of the geometric study {Registered Document 172} – TNO hasn't received any new data from Europe, Japan, Canada or Australia. Some new data has been provided by the US however TNO hasn't been able to decode data in the larger excel file {document 173} (information supplied by vehicle manufacturers). Also from a smaller set of measured data of NCAP cars {document 174} – only 2 door data could be used. Seat track length and H-point were used to calculate R-point.

The analysis is being conducted to establish any difference between US and other fleets in regard to wheelbase / H-point positioning.

Mr Lowne commented that a worst case would aim at the passenger cell (miss A and C pillar) and the EEVC longitudinals would align quite well with the vehicle data presented by Mr van Ratingen.

Mr Mueller undertook to seek further data from OICA members and provide to Mr van Ratingen, particularly for vehicles not supplied to the US market. **(ACTION)**

JAMA undertook seek this information as well. **(ACTION)**

Mr van Ratingen to supply proforma of details required. **(ACTION)**

8.2. Compilation into single database [EEVC]

Necessary data for this exercise is not available – see 8.1

9. Accident Studies

9.1. REMOVED: Japanese side impact fatal data – gender, age and seating position [Japan]

Already dealt with during December 2001 meeting.

9.2. Non struck side injuries based on global data- single occupant vs occupant-to-occupant interaction [TC] {Registered Document 175}

Mr Dalmotas presented an analysis based on a sample of single event side impacts using a narrow definition of side impact collisions. Crashes were from Canada in years 1988 to 1998.

Restraint use was found to have an effect (shifting crash involvement towards non-struck side). There was very little effect observed to the composition of injured drivers from the presence of an accompanying front passenger.

10. Test Results and Test Matrices

10.1. Update on the current status of the IIHS MDB and future test programs for side impact protection evaluation [IIHS] – Presentation by Mr Lund, IIHS {Registered Document 169}

The barrier is designed to represent the geometry of SUV and pickups – not necessarily to “be” an SUV.

Mr Lowne raised the possibility of defining a distinction between smaller (generally monocoque) and larger (body-on-frame) SUVs.

Mr Lund noted that even cars by definition are required to have bumpers that are higher than the sills of most cars

The barrier is designed for a repeatable head strike – this occurred in Focus test, leading to higher HIC than Explorer. The MDB was not found to cause more damage than Explorer – there are a lot of Explorers on US roads.

IIHS believe the tests shown validate the barrier as matching SUV / pickup. A test was conducted with a raised (1900 kg) mass against the Focus – no significant effect was observed with change in mass – still no head contact.

It was noted that the Volvo's SAB misdeployed (it did not break out from the seat) – tests by other labs found higher injury values with a properly deployed SAB. The Grand-Am was found to have fairly good injury numbers, despite having no Side Impact protection features. IIHS are contemplating value of specifying neck criterion, as there is little evidence of real world neck injury in side impacts.

Tests with Increased velocity and crabbing were conducted in an attempt to replicate head contact. Increased speed (50km/h perpendicular) produced head contact (perpendicular or crabbed). There was little difference in accelerations (lateral and fore / aft) between crabbed and perpendicular. Trend seen in Focus was similar for Grand Am. Lateral acceleration slightly higher in Grand Am crabbed test.

Conclusions:

No evidence to support re-introduction of a crabbed test

Speed should be 50 km/h

Mass reduced to 1500kg – higher mass does not offer any real benefit.

Impact point 30cm rearward of FMVSS 214

IARV numbers used so far are the same as used by the OOP technical WG. IIHS have some uncertainty about appropriate injury values and relationship between real and age adjusted risk curves.

Mr Lund advised that this and other IIHS research could be accessed at www.highwaysafety.org/presentations/sice.htm

Mr Seyer thanked Mr Lund for making the presentation to the group.

10.2. IIHS MDB to Megane and Freelanders to Camry [TC]

Mr Dalmotas presented Canadian Freelanders v Camry test results (Sid IIs dummies front and rear) {Registered Document 171} with the following observations:

Rear dummy was loaded (though loads are typically oblique rather than lateral because of door crush, and are therefore not well recorded by the SID-IIs dummy)

The IIHS barrier provides quite good representation of car to car test

In the overall test series thorax airbags were found to have generally improved car-car thorax response, but no benefit was observed for the SUV – car series

The Freelanders are one of the more aggressive bullet vehicles, with a high load path, but less head contact due to leading edge shape

Mr Seyer requested that TRL seek funding to conduct a perpendicular (stationary target) Freelanders to Camry test. **(ACTION)** TC suggested that, given a European style bumper beam that TC could run the test.

TC is planning to run an IIHS barrier to Camry test at 1850kg mass, to match the Freelanders test.

IIHS Barrier to Megane test, by TC has not yet been performed.

10.3. POSTPONED: Further analysis of full scale tests using IIHS barrier [Japan]

10.4. OICA load cell wall data - Laguna II, Mondeo, Focus, Corsa, Taurus, Volvo S80 [OICA]

No data has been collected to date – Mr Southgate to coordinate with J Kianthra.

(ACTION) Ford does not collect load cell data (some have been conducted by NHTSA). Mr Mueller to also liaise with Renault to see if results are available. **(ACTION)**

OICA are happy to provide information where available, but do not see what use the information is. Mr Lowne suggested that at least the crude distribution across the width of the barrier.

Data provided as 6 blocks can be summarised from higher resolution load cell walls.

The revised EEVC barrier design was based on load cell data from Japanese full width rigid wall tests.

10.5. Suitability of load cell data from frontal tests (ODB) for specification of stiffness of side impact bullet [TC, EEVC]

It was unclear how load cell data (rigid full frontal, thin honeycomb or offset NCAP) can be applied to stiffness and geometry of the side impact crash. There is difficulty in differentiating between soft front structures that crush to become rigid, or initially rigid structures that deflect in a side impact situation.

It was agreed that the major useful data is the distribution of the stiffness in the first small part (1-2 inches) of crush of the striking vehicles.

It was noted that the barrier should reflect the current vehicle fleet – more compatible vehicle front structures will have an effect but not for many years.

It was agreed that ODB data, being only acceleration based is not sufficient for barrier element design.

10.6. NHTSA Presentation of Pole Impact Data

Mr Kianthra presented some requirements of the current FMVSS 201 pole test procedure {Document 176}.

Combination of in-vehicle test and pole test being considered (currently optional).

Complete test procedure available at www.nhtsa.dot.gov/cars/testing/procedures.

Mr Kianthra also presented some results of pole impact test comparisons using ES-2 and SID-H3 in vehicles with and without airbag head protection. {Document 177} and a comparison of oblique and perpendicular test results for 1 vehicle with ES-2 and SID-H3 {Document 178}. An oblique impact appeared capable of loading the head and thorax simultaneously.

11. Status of Draft Test Procedures

11.1 Static Out of Position Side Airbag Test Procedure

The IIHS technical working group finalised its report approximately 1.5 years ago and has been incorporated by Canada in a Side Impact MOU with manufacturers. The Group has met to discuss some procedural concerns – points of clarification on positioning. There were also concerns from NHTSA whether additional seating procedures for additional worst case positions. The report is currently being finalised to produce a set of updated guidelines that most groups are happy with.

Mr Kianthra advised that NHTSA rulemaking have not received notification of changes, currently seeking advice from manufacturers as to which are meeting the tests – some have not provided feedback.

ISO Working Group is using the same procedures as the IIHS documents – ISO does not set performance requirements.

Transport Canada will be able to provide a final document of requirements shortly.

As there is no other research being undertaken on out of position in side airbags, the group agreed that the IIHS / TC test procedures should be accepted to be provided by the IHRA SIWG as an out of position test procedure.

11.2 Interior headform test

Current proposed procedure takes FMVSS 201 target points but restricts to locations which could be contacted in side impacts by restrained occupants. Allows testing at a worst case point in between

the specific points of FMVSS 201 – impact angle always as close as possible to perpendicular. 1st iteration of the draft document to be provided for the next meeting. **(ACTION: Mr Lowne)**

Mr Kianianthra suggested that NHTSA would need to compare requirements of FMVSS 201 to the proposed EEVC requirements before commenting whether these requirements were suitable to be accepted as an IHRA SIWG test requirement. **(ACTION)**

Mr Kianianthra undertook to provide some data on non-struck side contacts for the next meeting. Suggested possibility of some additional contact zones for areas where belt use is low. **(ACTION)**

11.3 Mobile deformable barrier

Mr Seyer proposed the following:

- Follow option of two test procedures, as recommended by the IHRA steering committee
- Using the new EEVC MDB test procedure to represent passenger car /small SUV (with a 5th percentile dummy)
- IIHS test procedure for a test more focussed at SUV – car impacts
- using test procedures being drafted by IIHS / EEVC for progress within pre ESV timeframe

Mr Dalmotas objected to this on the basis that there is a need for a single comprehensive test and suggested that there is no evidence that the EEVC test is any more representative of car to car impacts than the IIHS barrier, and that many current vehicles would pass the EEVC test – therefore the test may deliver no safety benefit.

Mr Lowne commented that the EEVC will not be able to accept the most severe test as the only test – therefore the goal of a single test procedure is not possible. It may be accepted that a higher level test (ie IIHS) could be accepted as an alternative to the lower level test if it can be shown that the more severe test will adequately force countermeasures for car to car impacts.

Mr Kianianthra noted that NHTSA would address the 50th percentile problem as a primary problem, based on accident data, with a possible supplementary test using the 5th percentile dummy.

Mr Dalmotas reiterated that vehicle to vehicle crashes show a predominance of female occupants, with males predominant in single vehicle crashes. The latest variant of IIHS barrier represents both an SUV and car. Should the SIWG recommend 2 barriers, then the IIHS/TC design would possibly have evolved to a more LTV-like character, with less compromise to include passenger cars.

Mr Kianianthra noted that NHTSA would require validation that the combination of tests (5th percentile in the MDB test and 50th percentile in the pole test) will provide sufficient countermeasures for a range of occupants, including 50th percentile.

Mr Kianianthra and Mr Seyer suggested that proposing two tests into a validation phase would provide some latitude to develop and select appropriate tests for the different regions.

Mr Lowne noted that input received from European industry is that a single test procedure at the level of the IIHS test would not be preferable to two tests, despite the benefits of harmonisation.

Mr Mueller suggested that in the report / ESV paper there should not be two separate test procedures that differ in only some sections – rather one document with the common parts shared. The group agreed that this was sensible if it was possible.

The group noted that:

- A single worst case test would be the ideal for harmonisation. However, this could only be achieved if such a worst case test could be shown not to produce an unacceptable degradation of protection for any body region. In addition, it would be difficult for countries without a large fleet of LTVs to justify a worst case test at the stringency of the proposed IIHS test.
- By taking at least 2 draft tests (eg the new draft EEVC Advanced European (AE)-MDB and the IIHS MDB) into the validation phase, there would be some latitude to develop and select

appropriate tests for the different fleet mixes and to examine whether a worse case test option is feasible.

Note: LTVs include SUVs, pickup trucks and vans

12. Other business

None raised

13. Next meeting(s).

To be held at BMW Research Centre, Munich on 16th / 17th of September (week of IRCOBI).

Following meeting to be held in Geneva, pre GRSP – scheduled for 9/10 December, possibility of starting on the Sunday 8th in order to complete meeting before the start of GRSP, afternoon of 10 December (to be decided at the Munich meeting).

Final meeting (5 days) pre ESV to be held February / March 2003 – possibly on the US West Coast (to be arranged by Mr Kianthra). **(ACTION)**

Mr Kianthra reiterated the IHRA SC's comments regarding the expectation that the SIWG complete its drafting work before the Nagoya ESV. With this in mind, he asked members to remain open to additional meeting(s) to achieve this goal.

14. Close

The Meeting was closed at 3:40 PM, 22 May

Note from Lyon meeting: NHTSA have conducted perpendicular and crabbed tests of IIHS barrier into load cell wall. Results to be presented at next meeting.